

REMARKS

Claims 1, 2 and 4-13 were pending and considered by the Examiner. Although indicated in the most recent Office Action as still pending, claim 3 was cancelled in the previous Amendment. In the current Office Action, Claims 1, 2 and 4-13 were rejected. In response, claims 1, 8, 9 and 13 have been amended. Following entry of this Amendment, claims 1, 2 and 4-13 will remain pending. Reconsideration and allowance are respectfully requested.

Claims 1, 2 and 4-8 have been rejected under 35 U.S.C. § 103 as being unpatentable over the teachings of U.S. Patent 5,282,363 (Ogawa et al.) in view of the teachings of U.S. Patent 5,251,442 (Roche). In comments on the rejection, the Examiner has acknowledged that Ogawa et al. “does not disclose that there is an adjustable hydraulic transformer having an inlet coupled to a pressure source, and an outlet; and a normally open bypass valve operatively coupling a hydraulic motor to selectively receive flow from the pressure source or the transformer outlet, depending on operating characteristics of the motor.” For this feature of independent claims 1 and 8, the Examiner has relied on the teaching of Roche, stating that Roche teaches a hydraulic motor connected at line 276 “to selectively receive flow from the pressure source (260) or an outlet of an adjustable hydraulic transformer (286), depending on an operating characteristic of the motor”.

In response thereto, claims 1 and 8 have been amended to more clearly recite the present invention. Accordingly, Applicants are of the opinion that independent claim 1, together with dependent claims 2 and 4-7; and independent claim 8 are now in condition for allowance, which is hereby respectfully requested.

The Examiner has acknowledged that Ogawa et al. does not teach the use of a transformer as recited in the pending claims.

Roche teaches a fluid power regenerator. With respect to the embodiment referred to by the Examiner, as shown in Fig. 5, Roche teaches a fixed displacement pump 260 providing fluid at a fixed flow rate through primary pressure line 268, and secondary pressure lines 270 and 272 that branch from primary pressure line 268. A check valve 274 is provided in secondary pressure line 270 and connects directly to a system output line 276. Secondary pressure line 272 connects to respective input ports of a first gang of displacers 278 having output ports connected to tertiary pressure lines 280, 282 and 284. Tertiary output line 280 connects to input ports of a second gang of displacers 286. The first gang of displacers 278 includes three displacers "A", "B" and "C", and the second gang of displacers 286 includes four individual displacers "a", "b", "c" and "d" (column 13, line 54 through column 14, line 6). Displacers of the embodiment shown in Fig. 5 are similar to those shown in earlier described embodiments of Roche, which are described to be "fixed displacement gear drives that can be used as either pumps or motors" (column 9, lines 7-8). Roche describes the purpose of the displacers, "instead of dumping a portion of the fluid flow directly to the reservoir ... in response to monitored pressures that exceed a predetermined system pressure, one or the other of the shut-off valves ... is allowed to open for routing the excess fluid through one of the displacers ... before emptying the fluid into the reservoir" (column 9, lines 28-35). The gangs of displacers are used to accommodate various fluid flow rates. The first gang of displacers 278 directs a predetermined portion of fluid flow from the fixed displacement pump 260 to the second gang of displacers 286. A remaining portion of the fluid flow through first gang of displacers 278 is divided between a system output line 276 and reservoir 264 (column 14, lines 49-60). The second gang of displacers 286 further divides a portion of the fluid flow in tertiary pressure line 280 into finer increments. Flow therefrom can be provided in finer increments to system output line 276 or to reservoir 264 (column 16, lines 3-9).

In contrast to the teachings of Ogawa et al. and Roche, alone or in combination, claims 1 and 8, as amended, each recite in part:

a hydraulic transformer having an inlet and an outlet, said inlet coupled with said pressure source, said transformer being adjustable to provide controlled pressure amplification of a fluid flowing therethrough;
(Emphasis added.)

Accordingly, Applicants are of the opinion that independent claims 1 and 8 each recite an invention patentable over the prior art, and which provides advantages over the prior art.

Ogawa et al. teaches a hydraulic circuit, but, as acknowledged by the Examiner, fails to teach the transformer recited in the pending claims. Roche teaches gangs of displacers operating alternatively as motors or pumps to divert flow and reduce back-pressure on a fixed displacement pump. Neither Ogawa et al. nor Roche, alone or in combination, teaches a hydraulic system or a work machine having a hydraulic transformer that is adjustable to provide controlled pressure amplification of a fluid flowing through the transformer, as recited in independent claims 1 and 8.

The present invention allows the efficient operation of hydraulic motors in different operating ranges depending upon whether the pressure received at the motor inlet is a non-amplified pressure direct from an accumulator, or an amplified pressure from the hydraulic transformer.

Applicants respectfully submit that independent claim 1, together with claims 2 and 4-7 dependent therefrom, and independent claim 8 are in allowable form. Reconsideration and allowance of claims 1, 2 and 4-8 over the rejection based upon the teachings of Ogawa et al. in view of Roche are respectfully requested.

Claims 9-13 have been rejected under 35 U.S.C. § 103 as being unpatentable over Ogawa et al. in view of U.S. Patent 6,311,488 (Maruta et al.) in view of Roche. The Examiner again acknowledges that Ogawa et al. does not disclose a transformer, and further acknowledges that

Ogawa et al. does not disclose a second motor having the features recited in the pending claims. For these features of the present invention, the Examiner again applies the teaching of Roche as in the rejection of claims 1, 2 and 4-8, and the teaching of Maruta et al. for a second hydraulic motor. Maruta et al. is cited for teaching a second motor, and not for any teaching of a transformer. Roche is the only reference relied on by the Examiner with respect to the recitation of a transformer in the pending claims. Applicants respectfully submit that Roche fails to teach the transformer recited in claims 9-13 for the same reasons as discussed above with respect to the rejection of claims 1, 2 and 4-8.

Roche teaches a fluid power regenerator. With respect to the embodiment referred to by the Examiner, as shown in Fig. 5, Roche teaches a fixed displacement pump 260 providing fluid at a fixed flow rate through primary pressure line 268, and secondary pressure lines 270 and 272 that branch from primary pressure line 268. A check valve 274 is provided in secondary pressure line 270 and connects directly to a system output line 276. Secondary pressure line 272 connects to respective input ports of a first gang of displacers 278 having output ports connected to tertiary pressure lines 280, 282 and 284. Tertiary output line 280 connects to input ports of a second gang of displacers 286. The first gang of displacers 278 includes three displacers "A", "B" and "C", and the second gang of displacers 286 includes four individual displacers "a", "b", "c" and "d" (column 13, line 54 through column 14, line 6). Displacers of the embodiment shown in Fig. 5 are similar to those shown in earlier described embodiments of Roche, which are described to be "fixed displacement gear drives that can be used as either pumps or motors" (column 9, lines 7-8). Roche describes the purpose of the displacers, "instead of dumping a portion of the fluid flow directly to the reservoir ... in response to monitored pressures that exceed a predetermined system pressure, one or the other of the shut-off valves ... is allowed to open for routing the excess fluid

through one of the displacers ... before emptying the fluid into the reservoir” (column 9, lines 28-35). The gangs of displacers are used to accommodate various fluid flow rates. The first gang of displacers 278 directs a predetermined portion of fluid flow from the fixed displacement pump 260 to the second gang of displacers 286. A remaining portion of the fluid flow through first gang of displacers 278 is divided between a system output line 276 and reservoir 264 (column 14, lines 49-60). The second gang of displacers 286 further divides a portion of the fluid flow in tertiary pressure line 280 into finer increments. Flow therefrom can be provided in finer increments to system output line 276 or to reservoir 264 (column 16, lines 3-9).

In contrast to the teachings of Ogawa et al. and Roche, alone or in combination, claims 9 and 13, as amended, each recite in part:

a hydraulic transformer having an inlet and an outlet, said inlet coupled with said pressure source, said transformer being adjustable to provide controlled pressure amplification of a fluid flowing therethrough;
(Emphasis added.)

Accordingly, Applicants are of the opinion that independent claims 9 and 13 each recite an invention patentable over the prior art, and which provides advantages over the prior art.

Ogawa et al. teaches a hydraulic circuit, but, as acknowledged by the Examiner, fails to teach the transformer recited in the pending claims. Maruta et al teaches a cooling fan drive apparatus, but not a transformer. Roche teaches gangs of displacers operating alternatively as motors or pumps to divert flow and reduce back-pressure on a fixed displacement pump. Neither Ogawa et al., Maruta et al and Roche, alone or in combination, do not teach a hydraulic system or a work machine having a hydraulic transformer that is adjustable to provide controlled pressure amplification of a fluid flowing through the transformer, as recited in independent claims 9 and 13. The present invention allows the efficient operation of hydraulic motors in different operating

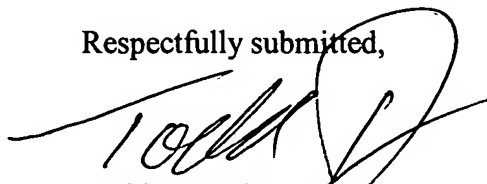
ranges depending upon whether the pressure received at the motor inlet is a non-amplified pressure direct from an accumulator, or an amplified pressure from the hydraulic transformer. Applicants respectfully submit that independent claim 9, together with claims 10-12 dependent therefrom, and independent claim 8 are in allowable form. Reconsideration and allowance of claims 9-13 over the rejection based upon the teachings of Ogawa et al. in view of Maruta et al and Roche are respectfully requested.

For the foregoing reasons, Applicants submit that no combination of the cited references teaches, discloses or suggests the subject matter of the amended claims. The pending claims are therefore in condition for allowance, and Applicants respectfully request withdrawal of all rejections and allowance of the claims.

In the event Applicants have overlooked the need for an extension of time, an additional extension of time, payment of fee, or additional payment of fee, Applicants hereby conditionally petition therefor and authorize that any charges be made to Deposit Account No. 20-0095, TAYLOR & AUST, P.C.

Should any question concerning any of the foregoing arise, the Examiner is invited to telephone the undersigned at (260) 897-3400.

Respectfully submitted,



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